

# Fairfield Public Schools

## Mathematics

Grade 1



## Fairfield Public Schools Mathematics Curriculum

### Grade 1

### Grade 1 Mathematics Overview

Grade one students develop, discuss and use efficient, accurate and generalizable methods to solve real world problems. Students develop a conceptual understanding of addition and subtraction, and use a variety of strategies. Students develop fluency of basic addition and subtraction facts with sums to twenty. They develop an understanding of whole number relationships and place value concepts grouping tens and ones. Students develop an understanding of the meaning and processes of measurement. Students reason about attributes of geometric shapes, as well as compose and decompose plane or solid figures.

### Grade 1 Mathematics Year-At-A-Glance

#### Pacing Guide

1st Marking Period			2nd Marking Period			3rd Marking Period			
September	October	November	December	January	February	March	April	May	June
<u>Unit 1</u> Fluency with addition and subtraction within 10	<u>Unit 2</u> Fact strategies with addition and subtraction within 20	<u>Unit 3</u> Defining attributes and partitioning 2-D and 3-D shapes	<u>Unit 4</u> Counting and place value	<u>Unit 5</u> Addition and subtraction within 100	<u>Unit 6</u> Measurement & Time	<u>Unit 7</u> Exploring Addition and Subtraction Multi-digit Numbers			

## Grade 1 Overview

<p><b>Central Understandings:</b> Insights learned from exploring generalizations through the essential questions. (Students will understand that...)</p> <ul style="list-style-type: none"> <li>• Patterns and functional relationships can be represented and analyzed using a variety of strategies, tools, and technologies.</li> <li>• Quantitative relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technologies.</li> <li>• Shapes and structures can be analyzed, visualized, measured, and transformed using a variety of strategies, tools, and technologies.</li> <li>• Data can be analyzed to make informed decisions using a variety of strategies, tools, and technologies.</li> </ul>	<p><b>Essential Questions</b></p> <ul style="list-style-type: none"> <li>• How do patterns and functions help us describe data and physical phenomena and solve a variety of problems?</li> <li>• How are quantitative relationships represented by numbers?</li> <li>• How do geometric relationships and measurements help us to solve problems and make sense of our world?</li> <li>• How can collecting, organizing, and displaying data help us analyze information and make reasonable and informed decisions?</li> </ul>	<p><b>Assessments</b></p> <ul style="list-style-type: none"> <li>• Formative Assessments</li> <li>• Summative Assessments</li> <li>• District –Wide Screening Tools</li> </ul>
<p><b>Content Outline:</b></p> <p>Unit 1. Fluency within 10 Unit 2. Fact strategies within 20 Unit 3. Geometry Unit 4. Place value Unit 5. Addition and subtraction within 100 Unit 6. Measurement &amp; Time Unit 7. Addition and Subtraction with multi-digit numbers</p>	<p><b>Mathematics Standards</b> CT Common Core State Standards (<a href="#">CCSS</a>)</p> <p><b>Fairfield Public Schools Skills Matrix</b> (<a href="#">Skills Matrix</a>)</p> <p><b>Primary Resources</b></p> <ul style="list-style-type: none"> <li>• <a href="#">About Teaching Mathematics</a>, Marilyn Burns</li> <li>• <a href="#">Contexts for Learning Mathematics</a>, Fosnot et al.</li> <li>• <a href="#">Scott Foresman · Addison Wesley 2004</a></li> <li>• <a href="#">Teaching Student-Centered Mathematics</a> –Van de Walle and Lovin</li> </ul>	

### Grade One Standards for Mathematical Practice

The K-12 Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. This page gives examples of what the practice standards look like at the specified grade level.

<i>Standards</i>	<i>Explanations and Examples</i>
Students are expected to: <b>1. Make sense of problems and persevere in solving them.</b>	In first grade, students realize that doing mathematics involves solving problems and discussing how they solved them. Students explain to themselves the meaning of a problem and look for ways to solve it. Younger students may use concrete objects or pictures to help them conceptualize and solve problems. They may check their thinking by asking themselves, “Does this make sense?” They are willing to try other approaches.
Students are expected to: <b>2. Reason abstractly and quantitatively.</b>	Younger students recognize that a number represents a specific quantity. They connect the quantity to written symbols. Quantitative reasoning entails creating a representation of a problem while attending to the meanings of the quantities.
Students are expected to: <b>3. Construct viable arguments and critique the reasoning of others.</b>	First graders construct arguments using concrete referents, such as objects, pictures, drawings, and actions. They also practice their mathematical communication skills as they participate in mathematical discussions involving questions like “How did you get that?”, “Explain your thinking,” and “Why is that true?” They not only explain their own thinking but listen to others’ explanations. They decide if the explanations make sense and ask questions.
Students are expected to: <b>4. Model with mathematics.</b>	In early grades, students experiment with representing problem situations in multiple ways including numbers, words (mathematical language), drawing pictures, using objects, acting out, making a chart or list, creating equations, etc. Students need opportunities to connect the different representations and explain the connections. They should be able to use all of these representations as needed.
Students are expected to: <b>5. Use appropriate tools strategically.</b>	In first grade, students begin to consider the available tools (including estimation) when solving a mathematical problem and decide when certain tools might be helpful. For instance, first graders decide it might be best to use colored chips to model an addition problem.
Students are expected to: <b>6. Attend to precision.</b>	As young children begin to develop their mathematical communication skills, they try to use clear and precise language in their discussions with others and when they explain their own reasoning.
Students are expected to: <b>7. Look for and make use of structure.</b>	First graders begin to discern a pattern or structure. For instance, if students recognize $12 + 3 = 15$ , then they also know $3 + 12 = 15$ . ( <i>Commutative property of addition.</i> ) To add $4 + 6 + 4$ , the first two numbers can be added to make a ten, so $4 + 6 + 4 = 10 + 4 = 14$ .
Students are expected to: <b>8. Look for and express regularity in repeated reasoning.</b>	In the early grades, students notice repetitive actions in counting and computation, etc. When children have multiple opportunities to add and subtract “ten” and multiples of “ten” they notice the pattern and gain a better understanding of place value. Students continually check their work by asking themselves, “Does this make sense?”

Adapted from Connecticut Standards for Mathematics

## Grade 1

### Unit 1: Launch - Whole Number Concepts, Estimation and Computation using Addition and Subtraction to Ten

The purpose of the launch is to establish classroom routines in a balanced math instructional model. The first unit is intended to engage students in thinking about previously taught material differently while the focus of the lessons is on learning how to engage one another as mathematicians using 21<sup>st</sup> century skills. Some examples include; turn & talk, think-pair-share, justify reasoning, and constructing viable arguments. Students represent their thinking using mathematical models and numbers, questioning peers for deeper understanding and clarification. The correctness of solutions lies within the logic of the mathematics. Students build on key number concepts to develop fluency of addition and subtraction within ten.

#### Big Ideas:

The central organizing ideas and underlying structures of mathematics.

- When counting a set, the number they end on is the number of objects in a set (Cardinality).
- When there are two groups and if each object in one group is paired with an object in the other group, then the groups each contain the same number of objects (One to one correspondence).
- Numbers grow by one, and exactly one, each time (Hierarchical Inclusion).
- The quantity stays the same regardless of the arrangement (Conservation of Number).
- Identifying patterns in mathematics helps us to make generalizations.
- Commutative Property for addition: The order of addends does not change the result ( $5+2=7$ ,  $2+5=7$ ).
- Associative Property for addition
  - Numbers can be composed and decomposed to make computations easier.
  - You can flexibly combine numbers using a variety of strategies:
    - ex.  $5+4$  can be thought of  $5+(2+2)$  or  $(5+2)+2$
- Contextual problems can be represented using a variety of problem structures.
- A variety of strategies can be used to solve addition and subtraction problems.

#### Thinking Ahead, Linking Big Ideas among units:

#### Unit 2: Fact strategies within Twenty

- Expand on unit one using sums up to twenty

#### Essential Questions

- Why do benchmark numbers help solve problems?
- How could you compose or decompose numbers to make them easier to add or subtract?
- What strategies could you use to add and subtract numbers?
- Which strategy is the most efficient for adding or subtracting a given set of numbers and why?
- Why do we count?

## Common Core State Standards

### Grade 1

#### Unit 1: Whole Number Concepts, Estimation and Computation using Addition and Subtraction within Ten

##### Operations and Algebraic Thinking

###### Represent and solve problems involving addition and subtraction.

1.OA.1. Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

1.OA.2. Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

###### Understand and apply properties of operations and the relationship between addition and subtraction.

1.OA.3. Apply properties of operations as strategies to add and subtract. *Examples: If  $8 + 3 = 11$  is known, then  $3 + 8 = 11$  is also known. (Commutative property of addition.) To add  $2 + 6 + 4$ , the second two numbers can be added to make a ten, so  $2 + 6 + 4 = 2 + 10 = 12$ . (Associative property of addition.)*

1.OA.4. Understand subtraction as an unknown-addend problem. *For example, subtract  $10 - 8$  by finding the number that makes 10 when added to 8. Add and subtract within 20.*

###### Add and subtract within 20.

1.OA.5. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).

###### Work with addition and subtraction equations.

1.OA.7. Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false?  $6 = 6$ ,  $7 = 8 - 1$ ,  $5 + 2 = 2 + 5$ ,  $4 + 1 = 5 + 2$ .

1.OA.8. Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations  $8 + ? = 11$ ,  $5 = \_ - 3$ ,  $6 + 6 = \_$ .*

##### Number and Operations in Base Ten

###### Extend the counting sequence.

1.NBT.1. Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

##### Measurement and Data

###### Represent and interpret data

1.MD.4. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

## Grade 1

### Unit 2: Whole Number Concepts, Estimation and Computation using Addition and Subtraction within Twenty

The purpose of this unit is to shift students from relying on counting strategies to strategies that involve composing and decomposing numbers. Students develop foundational understanding of algebraic properties. They understand that numbers can be grouped in a variety of ways, or presented in a different order, and the quantity will stay the same. Students develop automaticity with basic facts by focusing on number relationships and the use of benchmark numbers to develop efficient strategies for computing.

#### Big Ideas:

The central organizing ideas and underlying structures of mathematics.

- When counting a set, the number they end on is the number of objects in a set (Cardinality).
- When there are two groups and if each object in one group is paired with an object in the other group, then the groups each contain the same number of objects (One to one correspondence).
- Numbers grow by one, an exactly one, each time (Hierarchical Inclusion).
- Compensation and Equivalence- when you lose one but gain it, the total stays the same ( $5+3$  is equivalent to  $4+4$ ).
- A collection of objects can be thought of as one group (Unitizing).
- Numbers can be grouped in a variety of ways, or presented in a different order, and the amounts stay the same.
  - commutativity-  $5+3=3+5$
  - associativity-  $(5+3)+2=5+(3+2)$
- Flexibility in composing and decomposing numbers leads to a generalization about the way in which the parts are related to the whole ( $5+3=8$  then  $8-3=5$ ).

#### Thinking Ahead, Linking Big Ideas among units

#### Unit 3 : Geometry: Defining Attributes and Partitioning 2-D and 3-D shapes

- Decomposing and composing shapes
- Partitioning shapes into part-whole relationship

#### Essential Questions

- Why do we count?
- How can two quantities be related?
- Why do benchmark numbers help solve problems?
- How could you compose or decompose numbers to make them easier to add or subtract mentally?
- What strategies could you use to add and subtract numbers?
- Which strategy is the most efficient for adding or subtracting a given set of numbers and why?
- How can you use benchmark numbers to help you solve problems with bigger numbers?
- What relationships help you to determine equivalence?
- How can you tell if two different representations of quantity are equivalent?

## Common Core State Standards

### Grade 1

#### Unit 2: Whole Number Concepts, Estimation and Computation using Addition and Subtraction within Twenty

##### Operations and Algebraic Thinking

###### Represent and solve problems involving addition and subtraction.

1.OA.1. Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

1.OA.2. Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

###### Understand and apply properties of operations and the relationship between addition and subtraction.

1.OA.3. Apply properties of operations as strategies to add and subtract. *Examples: If  $8 + 3 = 11$  is known, then  $3 + 8 = 11$  is also known. (Commutative property of addition.) To add  $2 + 6 + 4$ , the second two numbers can be added to make a ten, so  $2 + 6 + 4 = 2 + 10 = 12$ . (Associative property of addition.)*

1.OA.4. Understand subtraction as an unknown-addend problem. *For example, subtract  $10 - 8$  by finding the number that makes 10 when added to 8. Add and subtract within 20.*

###### Add and subtract within 20.

1.OA.5. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).

1.OA.6. Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g.,  $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$ ); decomposing a number leading to a ten (e.g.,  $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$ ); using the relationship between addition and subtraction (e.g., knowing that  $8 + 4 = 12$ , one knows  $12 - 8 = 4$ ); and creating equivalent but easier or known sums (e.g., adding  $6 + 7$  by creating the known equivalent  $6 + 6 + 1 = 12 + 1 = 13$ ).

###### Work with addition and subtraction equations.

1.OA.7. Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false?  $6 = 6$ ,  $7 = 8 - 1$ ,  $5 + 2 = 2 + 5$ ,  $4 + 1 = 5 + 2$ .

1.OA.8. Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations  $8 + ? = 11$ ,  $5 = \_ - 3$ ,  $6 + 6 = \_$ .*

##### Number and Operations in Base Ten

###### Extend the counting sequence.

1.NBT.1. Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

##### Measurement and Data

###### Represent and interpret data

1.MD.4. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.



## Grade 1

### Unit 3: Geometry: Defining Attributes and Partitioning 2-D and 3-D Shapes

The purpose of this unit is to develop relationships among geometric shapes. Students compose and decompose plane or solid figures and build understanding of part-whole relationships, as well as the properties of the original and composite shapes. They recognize and compare shapes from different perspectives and orientations. Students partition shapes into fractional parts.

#### Big Ideas:

The central organizing ideas and underlying structures of mathematics.

#### Essential Questions

- What makes shapes alike and different can be determined by a variety of geometric properties. (e.g. Shapes have sides that are parallel, perpendicular, or neither)
- Shapes can be seen from different perspectives.
- The ability to perceive shapes from different viewpoints helps us understand relationships between 2-D and 3-D figures and mentally change the position and size of shapes.
- Fractional parts must be of equal size.
- The more the whole is divided into equal parts, the smaller the parts. (ex. fourths are smaller than halves)
- Fractional parts have special names that tell how many parts of that size are needed to make the whole. (ex. fourths require four parts to make a whole)

- What makes shapes alike and different?
- What shapes make up larger shapes?
- How does breaking a larger shape into smaller shapes help you to think about the attributes of the shape?
- What is a fraction?
- How can different shapes be divided into two equal parts and four equal parts?
- How can you tell when a fraction is larger/smaller when comparing fractions?

#### Thinking Ahead, Linking Big Ideas among units:

#### Unit 4: Place Value

- Students think of whole numbers between 10 and 100 in terms of tens and ones (especially recognizing 11-19 as composed of ten and some ones).

**Common Core State Standards**

**Grade 1**

**Unit 3: Geometry: Defining Attributes and Partitioning 2-D and 3-D Shapes**

**Geometry**

**Reason with shapes and their attributes.**

1.G.1. Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.

1.G.2. Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.

1.G.3. Partition circles and rectangles into two and four equal shares, describe the shares using the words *halves*, *fourths*, and *quarters*, and use the phrases *half of*, *fourth of*, and *quarter of*. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.

## Grade 1

### Unit 4: Place Value

The purpose of this unit is to develop the understanding of place value and extend the counting sequence using real world experiences. Students develop an understanding of whole number relationships using place value concepts. Gathering data and studying patterns in our place value system deepen the understanding of place value concepts.

#### Big Ideas:

The central organizing ideas and underlying structures of mathematics.

- A digit can represent ones or tens or hundreds, depending on where it is placed.
- Place value patterns occur when making and adding groups of ten.
- Compensation and Equivalence: when you lose one but gain it, the total stays the same. (Ex.  $5+3$  is equivalent to  $4+4$ )
- A collection of objects can be thought of as one group (Unitizing).
- The groupings of ones, tens, and hundreds can be put together and taken apart in different ways. (Ex.  $23=2$  tens and 3 ones or 1 ten and 13 ones or 23 ones)
- Numbers can be grouped in a variety of ways, or presented in a different order, and the amounts stay the same.  
     commutativity-  $5+3=3+5$   
     associativity-  $(5+3)+2=5+(3+2)$

#### Thinking Ahead, Linking Big Ideas among units

#### Unit 5- Addition and subtraction with multi-digit numbers

- Extending the counting sequence
- Adding and subtracting within 100 using a variety of strategies

#### Essential Questions

- What pattern do you see in our number system when you count by \_\_\_\_?
- How do you determine the value of a number given its place in the number?
- Which strategy is the most efficient for counting and why?
- How are two quantities related?
- How can a number be decomposed in different ways?
- What is the most efficient way to compose or decompose a number?
- How do benchmark numbers help you determine the total number of objects?

**Common Core State Standards**  
**Grade 1**  
**Unit 4: Place Value**

**Number and Operations in Base Ten**

**Extend the counting sequence.**

1.NBT.1. Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

**Understand place value.**

1.NBT.2. Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

- a. 10 can be thought of as a bundle of ten ones — called a “ten.”
- b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
- c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

1.NBT.3. Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols  $>$ ,  $=$ , and  $<$ .

**Use place value understanding and properties of operations to add and subtract.**

1.NBT.5. Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

**Measurement and Data**

**Represent and interpret data**

1.MD.4. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

## Grade 1

### Unit 5: Whole Number Concepts, Estimation and Computation using Addition and Subtraction within 100

The purpose of this unit is to introduce measurement as a context for addition and subtraction of multi-digit numbers. Students will use a variety of strategies that will be modeled using the open number line. Place value concepts will be reinforced with addition and subtraction. Students will use strategies as flexible methods of computing that vary with the numbers and the situation. Students will flexibly, accurately, and efficiently add and subtract.

#### Big Ideas:

The central organizing ideas and underlying structures of mathematics.

- Numbers can be decomposed and the smaller amounts can be added in varying orders, yet still be equivalent (Associative and Commutative properties).
- There are place value patterns that occur when adding on groups of ten.
- A collection of objects can be thought of as one group (Unitizing).
- Flexible methods of computing vary with the numbers in the situation.
- Distance is measured as a series of iterated units.
- Units used in measuring can vary but the results will be equivalent.

#### Thinking Ahead, Linking Big Ideas among units:

#### Unit 6: Geometry

- Students compare objects indirectly.
- Students understand time as units of measure in hours and half hours.

#### Essential Questions

- How can benchmark numbers, like five and ten, help you to add and subtract?
- How do you know if your answer is correct?
- How do you know if your strategy will work for all numbers?
- Why is it important to consider the numbers first before you choose an efficient strategy to solve the problem?
- How can you tell when a strategy is most efficient for a particular problem?
- Which strategy is most efficient for keeping track of your measurement?
- How can measuring the same object give you different lengths?

## Common Core State Standards

### Grade 1

#### Unit 5: Whole Number Concepts, Estimation and Computation using Addition and Subtraction within 100

##### Operations and Algebraic Thinking

###### Understand and apply properties of operations and the relationship between addition and subtraction.

1.OA.3. Apply properties of operations as strategies to add and subtract.<sup>2</sup> *Examples: If  $8 + 3 = 11$  is known, then  $3 + 8 = 11$  is also known. (Commutative property of addition.) To add  $2 + 6 + 4$ , the second two numbers can be added to make a ten, so  $2 + 6 + 4 = 2 + 10 = 12$ . (Associative property of addition.)*

###### Add and subtract within 20.

1.OA.5. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).

###### Work with addition and subtraction equations.

1.OA.7. Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false?  $6 = 6$ ,  $7 = 8 - 1$ ,  $5 + 2 = 2 + 5$ ,  $4 + 1 = 5 + 2$

##### Number and operations in base ten

###### Extend the counting sequence.

1.NBT.1. Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

###### Understand place value.

- 1.NBT.2. Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:
- 10 can be thought of as a bundle of ten ones — called a “ten.”
  - The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
  - The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

###### Use place value understanding and properties of operations to add and subtract.

1.NBT.4. Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.

1.NBT.6. Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

## Grade 1

### Unit 6: Measurement

The purpose of the unit is to develop an understanding of the meaning and processes of measurement. It focuses on helping students understand what it means to estimate and measure length using a variety of non-standard and standard units. Students will describe the relationship between the size of the measurement unit and the number of units needed to measure something. Students apply their understanding of measurement to time to the hour and half hour. Students will learn to use measurement tools including the digital and analog clock.

#### Big Ideas:

The central organizing ideas and underlying structures of mathematics.

- Different units are appropriate for measuring specific objects in different contexts.
- Estimation helps develop familiarity with the specific unit of measure being used.
- Direct comparisons can be made by measuring the difference in length between two objects.
- Time is the duration of an event from beginning to end.
- Time can be measured in standard units (e.g. seconds, minutes, hours, days).
- Recognize the time on a clock by reading the hands.
- Fractions are relations: the size of a fractional part is relative to the size of the whole and the size of the whole (unit) is important (e.g. half past, quarter till, quarter after).

#### Thinking Ahead, Linking Big Ideas among units:

### Unit 7: Exploring Multi-digit Addition and Subtraction

- Algebraic properties help to make estimation and mental computation easier.

#### Essential Questions

- Why is it important to keep the non-standard unit of measure the same when making measurements?
- What do you notice about measuring the same objects with two different non-standard units of measure?
- When measuring a given object, how is the size of the unit related to the number of units needed?
- When is an accurate measure important and when is it practical to estimate?
- What would happen if you changed your unit of measure?
- How is the clock divided into equal segments?
- How are units of time related to one another?

**Common Core State Standards  
Grade 1  
Unit 6: Geometry**

**Measurement and Data**

**Measure lengths indirectly and by iterating length units.**

1.MD.1. Order three objects by length; compare the lengths of two objects indirectly by using a third object.

1.MD.2. Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.*

**Tell and write time**

1.MD.3 Tell and write time in hours and half-hours using analog and digital clocks

**Geometry**

***Reason with shapes and their attributes.***

1. G.3. Partition circles and rectangles into two and four equal shares, describe the shares using the words *halves*, *fourths*, and *quarters*, and use the phrases *half of*, *fourth of*, and *quarter of*. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares. (Students do not need to learn formal names such as “right rectangular prism”).



## Grade 1

### Unit 7: Exploring Whole Number Concepts, Estimation and Computation using Addition and Subtraction Multi-digit Numbers

The purpose of this unit is to deepen the development of addition and subtraction concepts and their inverse relationship. Greater facility with mental computation strategies and estimation become more significant as students evaluate the efficiencies of alternative strategies including the standard algorithm. Algebraic properties are applied to whole numbers when students compute using partial sums. Although greater numbers are explored, automaticity with basic facts with addition and subtraction 0-10 is the goal by the end of grade 1. Students will use a variety of strategies that will be modeled including the use of the open number line. Place value concepts will be reinforced with addition and subtraction. Students will use strategies as flexible methods of computing that vary with the numbers and the situation. Students will flexibly, accurately, and efficiently add and subtract within twenty.

#### Big Ideas:

The central organizing ideas and underlying structures of mathematics.

#### Essential Questions

- Numbers can be decomposed and the smaller amounts can be added in varying orders, yet still be equivalent
- The use of algebraic properties (associative and commutative properties), can make mental computation easier.
- There are place value patterns that occur when adding on groups of ten.
- A collection of objects can be thought of as one group (Unitizing).
- Flexible methods of computing vary with the numbers in the situation.
- Distance is measured as a series of iterated units.
- Units used in measuring can vary but the results will be equivalent.

- How do partial products sums make it easier to do mental computations?
- What different strategies could we use to add and subtract?
- How are addition and subtraction related?
- How is a number line like a ruler?  
How do benchmark numbers like 5 and 10 help you solve problems?
- How do you know if your answer is correct?
- How do you know if your strategy will work for other numbers?
- How can decomposing numbers make it easier to mentally compute?
- How can the number sentence be thought of in different ways?
- Why is it important to consider the numbers first before you choose an efficient strategy to solve the problem?
- How can you tell when a strategy is most efficient for a particular problem?
- How do you know which operation to use when solving a problem?

#### Thinking Ahead, Linking Big Ideas:

#### Grade 2

- Students in grade two build on their understanding of the place value from grade one.
- They develop flexible and efficient strategies for computing multi-digit whole numbers with addition and subtraction.

## Common Core State Standards

### Grade 1

#### Unit 7: Exploring Whole Number Concepts, Estimation and Computation using Addition and Subtraction Multi-digit Numbers

##### Operations and Algebraic Thinking

##### Understand and apply properties of operations and the relationship between addition and subtraction.

1.OA.3. Apply properties of operations as strategies to add and subtract. *Examples: If  $8 + 3 = 11$  is known, then  $3 + 8 = 11$  is also known. (Commutative property of addition.) To add  $2 + 6 + 4$ , the second two numbers can be added to make a ten, so  $2 + 6 + 4 = 2 + 10 = 12$ . (Associative property of addition.)*

##### Add and subtract within 20.

1.OA.5. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).

##### Work with addition and subtraction equations.

1.OA.7. Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false?  $6 = 6$ ,  $7 = 8 - 1$ ,  $5 + 2 = 2 + 5$ ,  $4 + 1 = 5 + 2$

##### Number and operations in base ten

##### Extend the counting sequence.

1.NBT.1. Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

##### Understand place value.

- 1.NBT.2. Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:
- 10 can be thought of as a bundle of ten ones — called a “ten.”
  - The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
  - The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

##### Use place value understanding and properties of operations to add and subtract.

1.NBT.4. Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.

1.NBT.6. Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.